

APPENDIX D

MOBILITY ANALYSIS

APPENDIX

Fallbrook

SUB-AREA PLAN



Mobility Analysis Report

Fallbrook Village Sub-Area Plan

*Prepared for:
County of San Diego
Planning and Development Services*

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1 EXECUTIVE SUMMARY

1.1 OBJECTIVE

The focus of the Fallbrook Village Sub Area Mobility Analysis Report is to document existing mobility conditions within the Fallbrook Town Center and identify potential streetscape treatments that improve access and mobility for users of all abilities and all modes. As outlined in the County of San Diego's 2018, Active Transportation Plan (ATP), communities should strive to create a built environment to improve safety to by reducing auto collisions with cyclists and pedestrians, increase accessibility and connectivity, and improve public health by encouraging walking and biking while maintaining the character of each community.

This report summarizes the key transportation elements and analysis in support of the streetscape improvements and opportunity sites identified in the Downtown Fallbrook Visioning Report (December 2020) as well community input received during public workshops, focus groups, and community questionnaires. These community engagement efforts are summarized in the Phase 2 Summary, *Community Engagement Report (Appendix A of the Fallbrook Sub Area Plan)*, by MIG under separate cover.

1.2 SUMMARY OF FINDINGS

The existing conditions assessment considers the physical roadway conditions and intersection operations as well as current pedestrian, bicycle, and transit facilities within the study area.

1.2.1 Existing Pedestrian Conditions

While the Pedestrian Environmental Quality Index (PEQI) analysis showed "reasonable" pedestrian facilities, the assessment focuses mainly on the overall pedestrian environment. The analysis considers things such as seating and landscaping as beneficial, however, these features also obstruct the already narrow sidewalks (approximately 5') reducing the effective width making pedestrian navigation difficult.

As part of the County's Active Transportation Plan, a Pedestrian Gap Analysis (PGA) was conducted to evaluate the pedestrian facilities throughout the County and provide a relative ranking system to identify and prioritize pedestrian improvements. The PGA identified some areas in the northeast area of the Town Center along South Mission Road and Pico Avenue as "very good", however the majority of the sidewalks along Main Avenue south of East Mission Road within the Town Center are considered "average". It should be noted that the results of the PGA analysis generally align with the PEQI analysis. Refer to **Chapter 3** of this report for an assessment of existing pedestrian facilities.

1.2.2 Existing Bicycle Facilities

The Bicycle Level of Traffic Stress showed poor results primarily due to the lack of bicycle facilities in Fallbrook. The bicycle facilities that are provided are limited to Class II facilities on portions of East Mission Road, Ammunition Road, and Fallbrook Street. Refer to **Chapter 4** of this report for an assessment of existing bicycle facilities.

1.2.3 Existing Transit Facilities

North County Transit District (NCTD) operates the local bus service within the Fallbrook Community. NCTD's BREEZE Route 306 travels along Mission Road and loops back down Main Avenue connecting Fallbrook, Bonsall, and Vista. The route travels to and from the Vista Transit Center which provides local connections to seven other BREEZE routes as well as the SPRINTER light rail line. Refer to [Chapter 5](#) of this report for an assessment of existing transit facilities.

2 INTRODUCTION

2.1 STUDY AREA

As shown in **Exhibit 1**, the study area for the bicycle and transit facility assessments includes the entire Fallbrook Village Sub-Area which is bounded by East Dougherty Street/Gum Tree Lane to the north, Morro Road to the east, East Fallbrook Street to the south, and Summit Avenue to the west.

The pedestrian assessment focuses on the Town Center along Main Avenue between Fallbrook Street and East Mission Road as shown in **Exhibit 2**.

2.1.1 Surrounding Roadway Network

The roadway characteristics of the surrounding roadway system in the vicinity of the project are described below:

North/South Mission Road is oriented in a north-south direction and is classified as a Boulevard with Intermittent Turn Lanes (4.2B) per the Fallbrook Mobility Element Network Figure M-A-7 of the County of San Diego General Plan. Mission Road provides the primary regional access to the SR-76 highway to the south and serves as the main cross-town thoroughfare. At the northern extents of the study area, Mission Road turns immediately to the east and heads directly to the I-15 freeway.

Within the Town Center, South Mission Road is 4-lane roadway with a posted speed limit of 35 miles per hour (MPH). On-street parallel parking is restricted within the Town Center with the exception of the segment between Hawthorne and W. Mission Road where unrestricted curb parking is allowed. The General Plan's Mobility Element currently recommends a Class IV Cycle Track along Mission Road from SR-76 to the I-15.

West/East Mission Road is oriented in an east-west direction and is classified as a Light Collector with Continuous Turn Lanes (2.2B) between North Mission Road and Brandon Road and a Boulevard with Intermittent Turn Lanes (4.2B) between Brandon Road and Interstate 15. Mission Road provides the primary regional access to the SR-76 highway to the south and serves as the main cross-town thoroughfare. At the northern extents of the study area, Mission Road turns immediately to the east and heads directly to the I-15 freeway.

Within the Town Center, West Mission Road is 3-lane roadway (2 westbound and 1 eastbound) with turn lanes between North Mission Road and Main Street, 2-lanes with a two-way-left-turn-lane between Main Street and Industrial Way (with the exception of approximately 1,200 feet between Iowa Street and Brandon Road), and 2-lanes with intermittent turn lanes between Industrial Way and the I-15 Freeway. The posted speed limit of 35 miles per hour (MPH). On-street parallel parking is restricted within the Town Center with the exception of the segment between Hawthorne and W. Mission Road where unrestricted curb parking is allowed. The General Plan's Mobility Element currently recommends a Class IV Cycle Track along Mission Road from SR-76 to the I-15.

Main Avenue is oriented in a north-south direction and is identified as a local public road per the Fallbrook Mobility Element Network Figure M-A-7 of the County of San Diego General Plan. Main Avenue serves the commercial downtown area of the Town Center and while it is unclassified, it is considered a major

corridor for planning purposes of the Sub-Area Plan and has the most potential for streetscape improvements to benefit local residents and local small business.

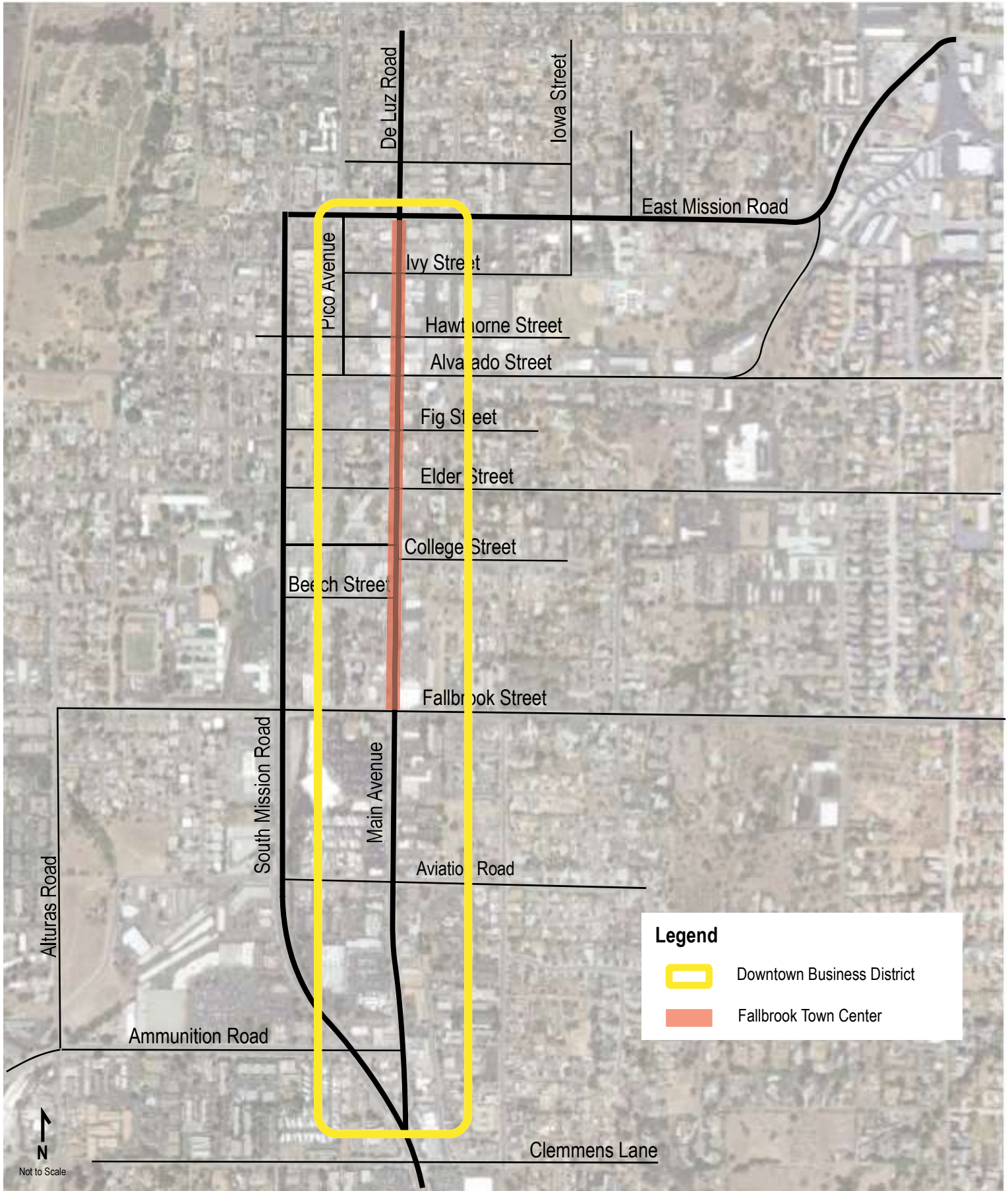
Main Avenue is a 2-lane roadway with two-way left-turn-lanes between South Mission Road and Elder Street and established left-turn lanes with intermittent raised landscaped medians between Elder Street and East Mission Road. On-street parking is provided to serve the commercial uses fronting the roadway. Sidewalks are provided on both sides of Main Avenue; however, the sidewalks are sub-standard with several gaps in the network. Further discussion on sidewalks is provided in *Chapter 2* of this report.

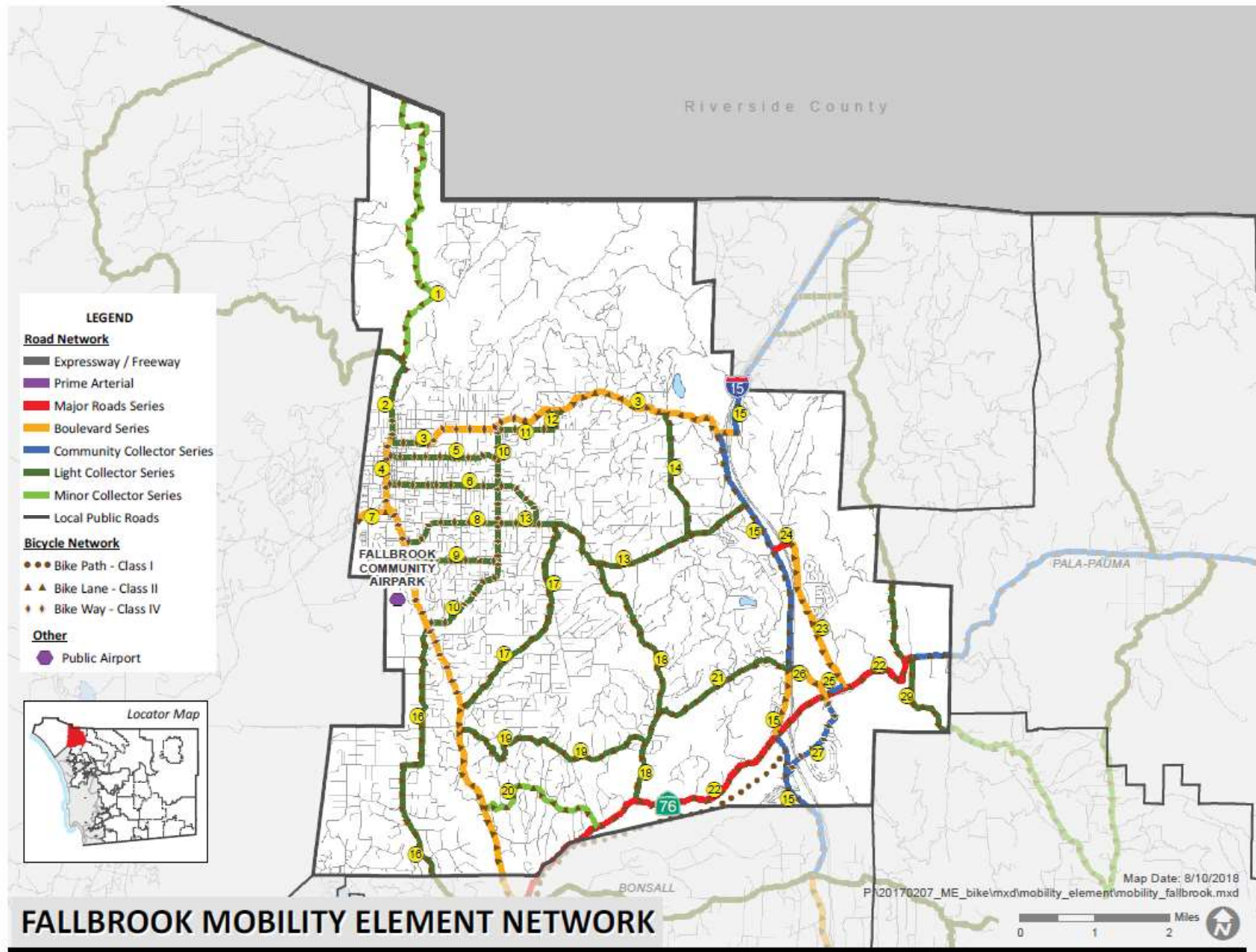
Fallbrook Street is a two-lane roadway with left-turn lanes oriented in an east-west direction and is classified as a Light Collector with Continuous Turn Lanes (2.2B) between South Mission Road and Stage Coach Lane. Fallbrook Street provides access to La Paloma Elementary School, the Fallbrook Senior Center, and the Fallbrook Community Center. The posted speed limit is 40 MPH with a reduction to 25 MPH near the school, senior center, and community center. There is a combination of existing Class II bike lanes and Class III sharrows along Fallbrook Street. These will ultimately be improved to Class IV cycle tracks per the General Plan's Mobility Element.

Alvarado Street is a two-lane roadway oriented in an east-west direction and is classified as a Light Collector with Intermittent Turn Lanes (2.2C). The posted speed limit is 35 MPH.

The General Plan's Mobility Element recommends a Class IV Cycle Track along Alvarado Street.

Exhibit 3 shows the Fallbrook Community Plan Mobility Element Network. **Appendix A** shows the associated Mobility Element Network Map and Matrix.





San Diego County General Plan

Figure M-A-7



- Sub-Area Plan Boundary
- Town Center
- Pico Promenade
- Schools
- Parks

3 EXISTING PEDESTRIAN CONDITIONS

3.1 EXISTING PEDESTRIAN FACILITIES

The purpose of the pedestrian assessment is to document the existing pedestrian facilities identify opportunities to improve the walkability of the Town Center. The existing pedestrian facility conditions were evaluated and focused on the Town Center along Main Avenue between Fallbrook Street and East Mission Road. **Chapter 6** of this report discuss planned future pedestrian improvements.

Exhibit 4 displays the existing pedestrian facilities within the Fallbrook Town Center.

3.1.1 Sidewalks

MIG, as support to County staff, conducted a walking tour of the Town Center on September 9th, 2021. Field notes taken during the tour, along with Google Earth, were utilized to evaluate the existing sidewalk facilities along Main Avenue.

The Americans with Disabilities Act (ADA) was passed in 1990, creating a standard for disabled accessibility to public facilities. To meet ADA compliance for pedestrian accessibility, the County of San Diego's Public Road Standards mandates that sidewalks must be a minimum of five feet wide. While the sidewalks within the Town Center consists of five foot to seven foot sidewalks for the majority of the corridor, other features such as planters, landscaping, and benches reduce the effective width to approximately four feet, making pedestrian navigation difficult. These narrower sidewalks are typically located on the segments of Mission Avenue between Hawthorne Street and Fig Street. In addition, the adjacent trees along the street have caused uplift on the sidewalks resulting in trip hazards. While the majority of the sidewalks within Fallbrook were constructed prior to ADA standards, future sidewalk improvements should consider minimum width requirement and bring the sidewalks into ADA compliance.

While some parts of the corridor consist of 8-foot to 11-foot sidewalks, these are essentially formed by extensions of adjacent parking lots. In the southern area of Main Avenue, south of College Street, wide driveways reduce the availability of sidewalks and increase the exposure for pedestrian to circulating vehicles.



Figure 1: Existing sidewalk on Main Avenue show deficient widths between building and streetlight. (<4 feet)



Figure 2: Existing crosswalk at Mission Road and Main Avenue show deteriorating pavement markings



Figure 3: Parking lot extensions into sidewalk right of way

Landscaping and tree shade are provided along the corridor, especially within the Town Center. However, the trees adjacent to the roadway have caused uplift on the sidewalk resulting in potential trip hazards. Additionally, there are currently publicly owned streetlights along the corridor which increase vehicular visibility at night. While these streetlights do assist in pedestrian visibility, there is no pedestrian scale lighting provided. On Main Avenue, sidewalks are primarily buffered from oncoming traffic by on-street parallel parking.

3.1.2 Crosswalks

Along Main Avenue, intersection controls consist of a combination of traffic signals and side-street stop controls. The traffic signals have controlled pedestrian crossing phases whereas the intersections with stop signs are uncontrolled pedestrian crossings. There are existing high-visibility continental crosswalks at locations like Aviation Road, Fallbrook Street, Elder Street, Fig Street, and Mission Road. High visibility crosswalks have extra paint to bring more awareness to drivers as well as increased visibility for the sight-impaired when compared to a “standard” crosswalk with a simple 12” line. Additional high-visibility crosswalks (i.e. continental crosswalks as shown in [Figure 4](#)), especially South of Elder Street and Fallbrook Street could be provided to increase pedestrian comfort while crossing Main Avenue. Throughout the corridor, there are different types of crosswalk designs including, stamped, continental, and striped. Many of the crosswalk pavement markings are beginning to fade and need to be restriped.

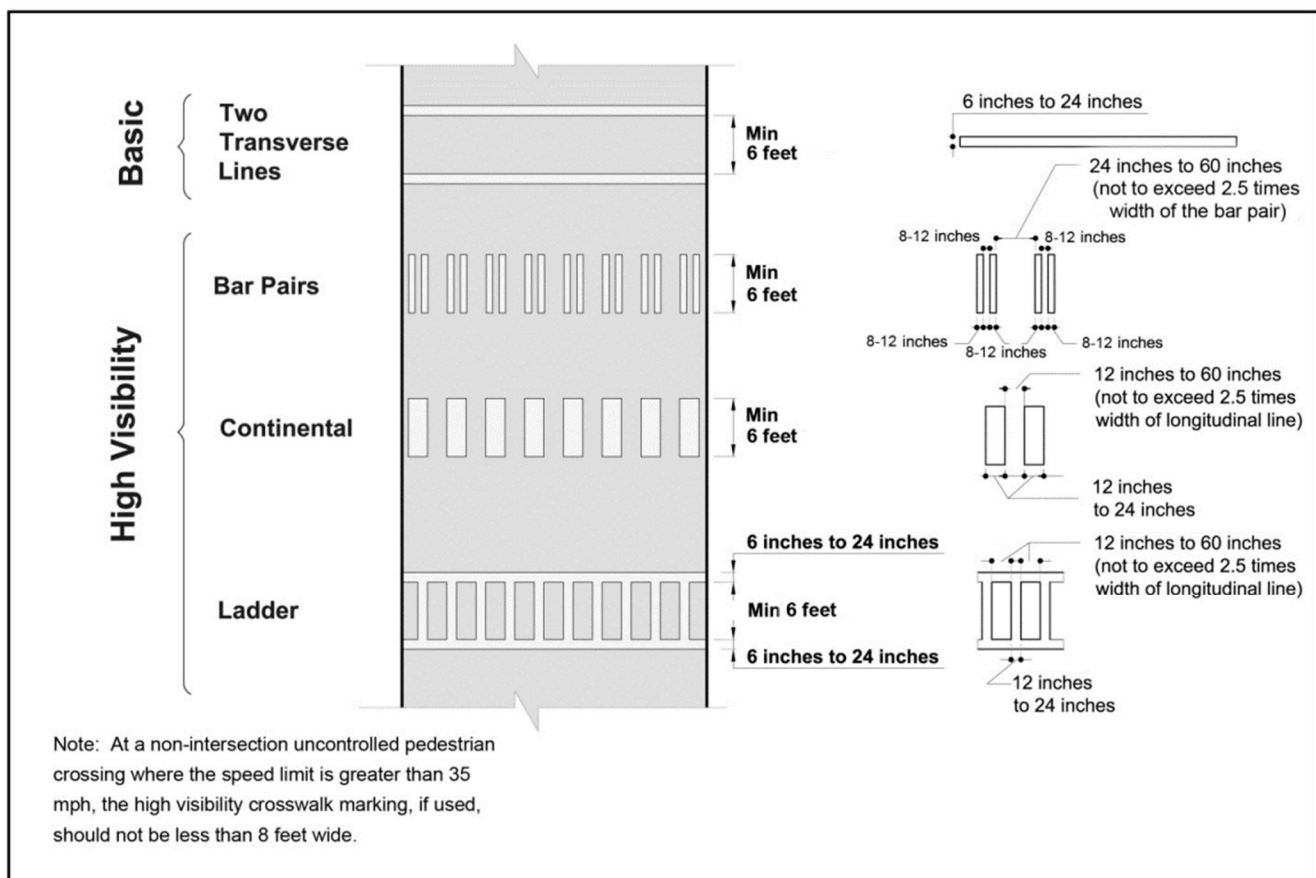


Figure 4: Crosswalk Pavement Marking Types

3.1.3 American Disabilities Act (ADA) Facilities

Table 1 summarizes the pedestrian-oriented ADA amenities at the intersections along Main Avenue within the Town Center between Elder Street and East Mission Road. The Americans with Disabilities Act (ADA) was passed in 1990, creating a standard for disabled accessibility to public facilities. To meet ADA compliance for pedestrian accessibility, the County of San Diego's Public Road Standards

TABLE 1 - MAIN AVENUE CROSSWALK FEATURES

Cross Street	Intersection Control	Marked Crosswalk Location (Type)		Pedestrian Ramps	Truncated Domes	PPB	Pedestrian Countdown?
Elder Street	TWSC	N/S/E/W (yellow continental)		Yes, all corners	None	NA	NA
Fig Street	TWSC	N/S/E/W (continental)		Yes, all corners	Yes, all ramps	NA	NA
Alvarado Street	Signal	N/S (standard w/ decorative paving)	E/W (standard)	Yes, all corners	None	Inconsistent	No
Hawthorne Street	TWSC	N/S (standard w/ decorative paving)	E/W (continental)	Yes, all corners	Yes, but missing NW ramp	NA	NA
Ivy Street	TWSC	N/S (standard w/ decorative paving)	E/W (continental)	Yes, all corners	Yes, all ramps	NA	NA
East Mission Road	Signal	S (standard w/ decorative paving)	N/E/W (continental)	Yes, all corners	Yes, all ramps	Inconsistent	No

Notes:

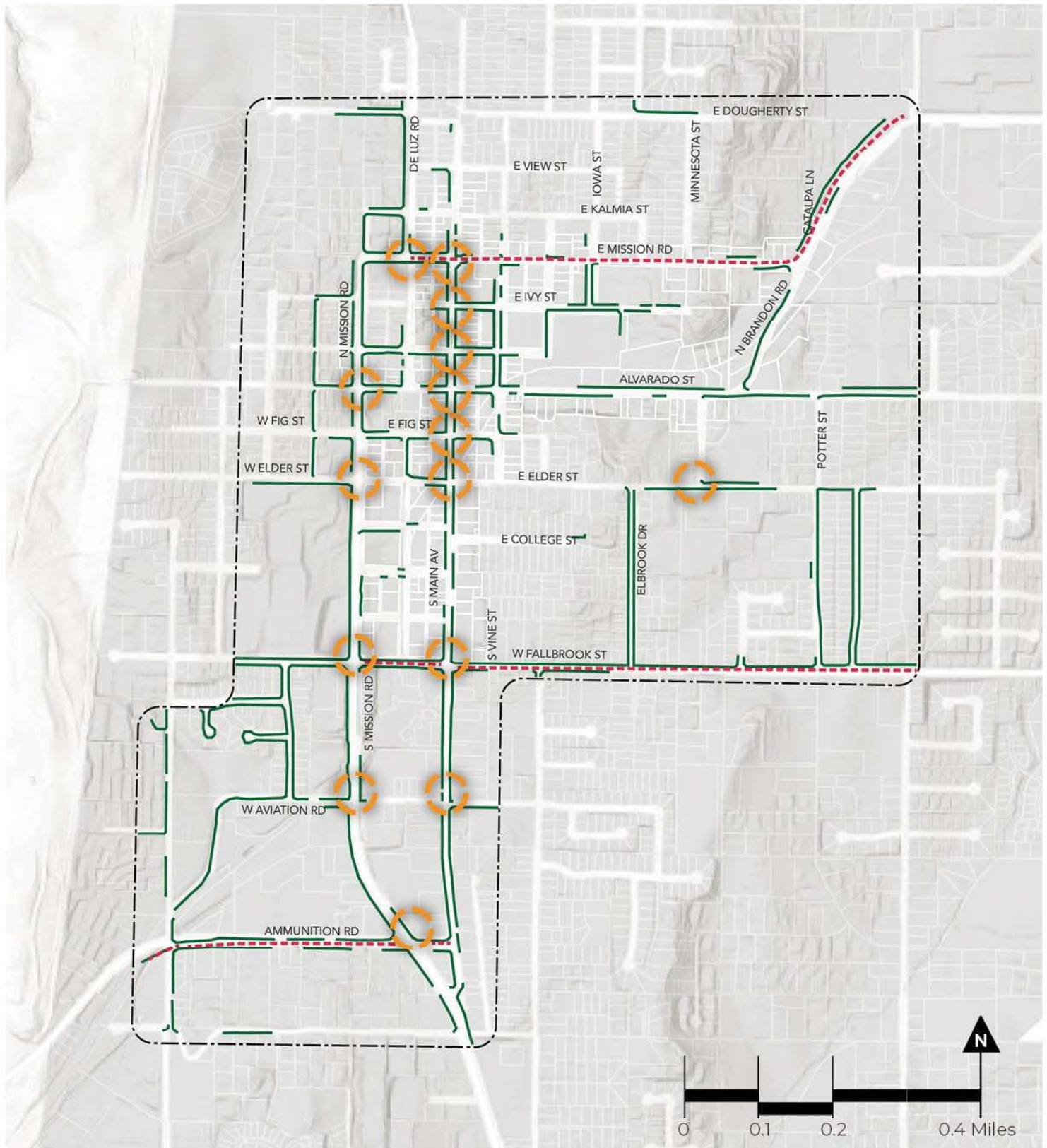
TWSC = Two-Way Stop Control

PPB = Pedestrian Push Button

Side of intersection: N = North; S = South; E = East; W = West

NA = Not Applicable

As discussed above, several of the signal-controlled intersections within the Town Center have controlled crossings. Over time, as the roadway facilities are improved, ADA features such as audible cues (or other non-visual indicators), the presence of 2-inch diameter pedestrian push buttons, and truncated domes at the curb ramps should be provided.



- Existing Sidewalks
- Existing Marked Crosswalks
- Existing Bike Lanes

Source: MIG

3.2 PEDESTRIAN ASSESSMENT

3.2.1 Pedestrian Environmental Quality Index (PEQI)

PEQI Methodology

Roadway segments and intersections were evaluated for pedestrian quality using the Pedestrian Environment Quality Index (PEQI). The PEQI is a qualitative pedestrian survey of the street that assesses the quality of the walking environment along roadway segments and at intersections.

The PEQI methodology is based on a tool originally developed in 2018 by the San Francisco Department of Public Health and later refined by Center for Occupational and Environmental Health at the University of California, Los Angeles. The methodology provides the point thresholds and weighted criteria for each item included in the index. The weighted criteria and scoring for each item are included in [Appendix B](#).

It should be noted that the PEQI Assessment is a high-level look at the study area and does not necessarily take into account the detailed pedestrian infrastructure. Therefore, the assessment should be considered more qualitative assessment of the quality and comfort of the overall pedestrian environment.

The PEQI assessment requires the collection of specific data about the elements of the physical environment and establishes the “walkability” of the area. The tool considers data in five (5) categories: intersection safety, traffic, street design, land use, and perceived safety. The elements shown to the right were assessed within the study area.

The index evaluates individual components of the physical environment, which are assessed for existence, quality, and overall pedestrian comfort. Information collected from the survey can be used to identify priority areas for improving the walkability of an area, either through individual index elements or for comprehensive improvements.

Analysis Criteria for PEQI Analysis

- **Intersection Safety**
 - Crosswalks
 - Countdown Signal
 - Traffic Signal
 - Crossing Distance
 - No Turn on Red
 - Traffic Calming Features
 - Pedestrian Signs
- **Traffic**
 - Number of Lanes
 - Two-Way Traffic
 - Vehicle Speed
 - Traffic Volume
 - Traffic Calming Features
- **Street Design**
 - Sidewalk Width
 - Sidewalk Surface
 - Sidewalk Obstructions
 - Presence of Curb
 - Driveway Cuts
 - Trees, Gardens
 - Public Seating (or bus stops)
 - Buffers
 - Distance between Controlled or
 - Enhanced Crosswalks
- **Land Use**
 - Public Art
 - Historic Sites
 - Retail
- **Perceived Safety**
 - Illegal Graffiti
 - Litter
 - Pedestrian-Scale Lighting
 - Construction Sites
 - Abandoned Buildings

The total PEQI score can range from 0 to 100 points, broken into the five categories shown in **Figure 5**.

PEQI Analysis

Existing pedestrian conditions along Main Avenue were analyzed using the PEQI, as discussed above. Existing conditions field inventory worksheets are provided in **Appendix B**. The results of this analysis are shown in **Exhibit 5** and **Table 2** (roadway segment analysis) and **Table 3** (intersection analysis), following this description.

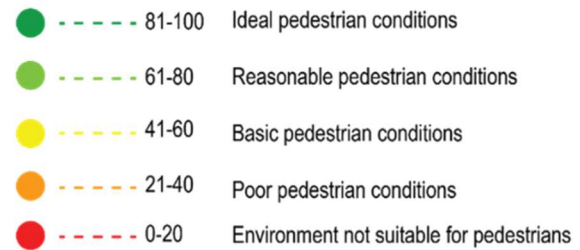


Figure 5: PEQI Score Range

As shown, the lowest pedestrian conditions are located on the southern extents of Main Avenue specifically near South Mission Road. This is due to the lack of sidewalk connections, wide driveways, and narrow sidewalks. Segments of Main Avenue between Ivy Street and Elder Street are shown in “Reasonable” conditions. Sidewalks along these segments have planters, and benches, improving pedestrian conditions according to the PEQI scoring. However, the adjacent intersections are shown in “Poor” conditions, due to the lack of pedestrian signs, high-visibility crossings, and ADA compliant curb ramps. In addition, the adjacent trees along the street have caused uplift on the sidewalks resulting in trip hazards.



Figure 6: Example of an intersection (Main Ave at Alvarado St) that may



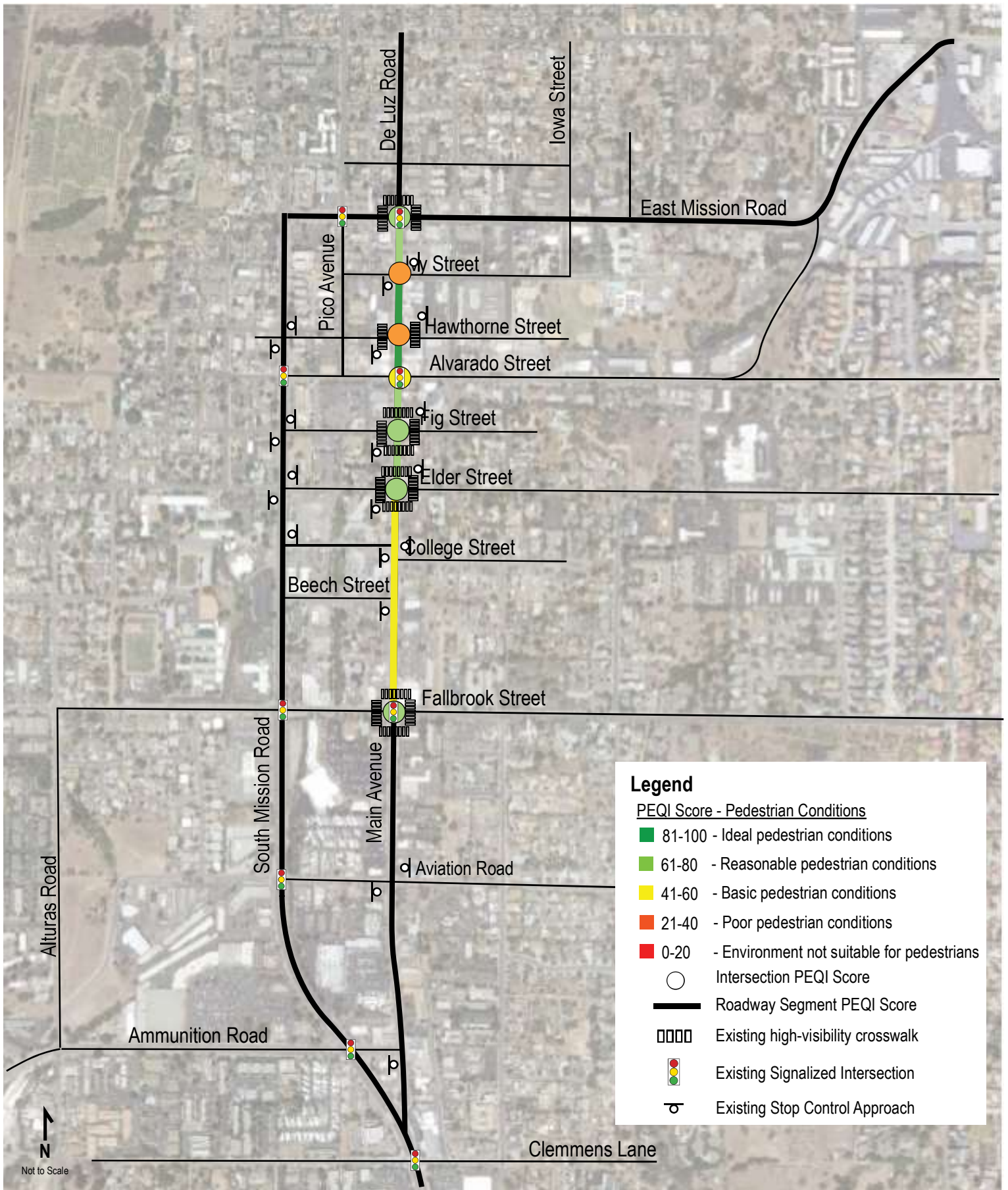
Figure 7: Example sidewalk along a roadway segment (east side of Main Ave north of Hawthorne St) with “reasonable pedestrian condition”

TABLE 2 – EXISTING CONDITIONS PEQI ROADWAY SEGMENT ANALYSIS

Street Name	Cross Street 1	Cross Street 2	Side of Street	Total PEQI Score	Pedestrian Conditions
Main Avenue	East Mission Road	Ivy Street	East	63	Reasonable Pedestrian Conditions
			West	62	Reasonable Pedestrian Conditions
	Ivy Street	Alvarado Street	East	71	Reasonable Pedestrian Conditions
			West	70	Reasonable Pedestrian Conditions
	Alvarado Street	Elder Street	East	71	Reasonable Pedestrian Conditions
			West	71	Reasonable Pedestrian Conditions
	Elder Street	Fallbrook Street	East	44	Basic Pedestrian Conditions
			West	44	Basic Pedestrian Conditions

TABLE 3 – EXISTING CONDITIONS PEQI INTERSECTION ANALYSIS

Street Name 1	Street Name 2	Total PEQI Score	Pedestrian Conditions
Main Avenue	East Mission Road	65	Reasonable Pedestrian Conditions
	Ivy Street	26	Poor Pedestrian Conditions
	Hawthorne Street	26	Poor Pedestrian Conditions
	Alvarado Street	55	Basic Pedestrian Conditions
	Fig Street	61	Reasonable Pedestrian Conditions
	Elder Street	78	Reasonable Pedestrian Conditions
	Fallbrook Street	68	Reasonable Pedestrian Conditions



3.2.2 Pedestrian Gap Analysis

As part of the County's Active Transportation Plan (ATP) (dated October 2018), a Pedestrian Gap Analysis (PGA) was conducted to evaluate the pedestrian facilities on over 700 miles of public maintained roadways throughout the unincorporated County. The segments that were evaluated were located within a quarter mile of an attractor (school, park, library, community center, etc.). The PGA analysis was included as Appendix D of the ATP report and was completed in 2016.

As shown in **Table 4**, the PGA is based on a point system (the lower the points the better score) which is used as a ranking system for comparison purposes of the relative need for pedestrian improvements. Within the Fallbrook Community the weighted scale is based out of 2,742 points. As outlined in the ATP Methodology, the PGA criteria used to rank the segments include:

- Condition of sidewalk/pathway and associated characteristics (obstructions, slope, grade, curb ramps, etc.)
- Distance from pedestrian generators
- Health data (supplied by County HHSA)
- Socioeconomic data (supplied by County HHSA)
- County Public Works Project Planning/Capital Improvement project list
- Proximity to schools

The total points of individual street segments provide a comparison ranking utilizing weight allocation based on the six ranking factors stated above. Each street segment PGA Ranking is displayed on the following color-coding point brackets. As outlined in the County's ATP, the more points allocated to a facility, the higher its potential priority for maintenance and improvement.

TABLE 4 – COUNTY OF SAN DIEGO ATP PGA RANKINGS

Color Code	PGA Point Range	
	Very Good	163-676
	Good	677-1169
	Average	1170-1556
	Poor	1557-1908
	Very Poor	1909-2742

The results of the PGA analysis for the Fallbrook Town Center are shown in **Exhibit 6**.

While some neighborhoods, primarily in the northeast area of the Village along South Mission Road and Pico Avenue, are identified as “very good”, the majority of the sidewalks along Main Avenue south of East Mission Road within the Town Center are considered “average”. The intersection of Main Avenue and Hawthorne Street as well as the segment of Alvarado Street east of Pico Avenue were identified as “very poor” with the highest scores.

Excerpts of the County's PGA analysis for the entire Fallbrook Community are contained in **Appendix C**.

The PGA system documents the conditions of sidewalks/pathways and the overall distance from local attractors (such as schools, parks, libraries, and commercial centers). A “very good” PGA ranking indicates that there are little to no pedestrian gaps and sidewalks/pathways are available, in good condition, and compliant with ADA requirements. A “very poor” PGA ranking indicates that there is no sidewalk or

pedestrian facility and a lack of pedestrian accessibility. When an existing pedestrian facility is ranked as “poor” and “very poor”, the facility should be further evaluated to address the gaps. The main priority of the PGA system is to prioritize the need for pedestrian improvements.

In comparison, the PEQI is a qualitative pedestrian survey of the street that assesses the overall quality of the walking environment along roadway segments and at intersections. When the PEQI score for a roadway segment or intersection results in “not suitable for pedestrians”, the PGA rank typically aligns with a ranking of “poor” or “very poor”.



Total Points	Driveway Points	Point of Interest
# = Segment ID, See table for scores	▲ 10 - 18	— Sidewalk
163 - 676	▲ 19 - 28	— No Sidewalk
677 - 1169	▲ 29 - 52	🚗 Ped Related Collision
1170 - 1556	▲ 53 - 88	📖 Library
1557 - 1908	● 0 - 18	🏫 School
1909 - 2742	● 19 - 56	🏠 Attractor Land Use
	● 57 - 94	🌳 Parks
	● 95 - 130	

Source: San Diego County ATP (2018)



Not to Scale

4 EXISTING BICYCLE CONDITIONS

Classification of bikeway facilities fall into one of the following categories as shown in **Figure 8**:

- **Class I – Multi-Use Bike Path:** Bike paths provide a completely separate off-road right of way for exclusive use of people walking and biking.
- **Class II – Bike Lane:** Bike lanes are defined by pavement striping and signage and effectively dedicate a portion of the roadway right-of-way for exclusive bicycle travel.
- **Class III – Shared Bike Route (aka “Sharrow”):** Bike routes are a shared use with vehicular traffic within a travel lane and used in conjunction with pavement striping and signage.
- **Class IV – Cycle Track:** Protected bike lanes (bikeway) provide space adjacent to the roadway that is exclusively for bicyclists and physically separated from vehicular travel lanes, parking and sidewalks.



Figure 8: Bicycle Facility Classifications

EXISTING BICYCLE FACILITIES

Currently, there are limited bicycle facilities located within the Fallbrook Community. Class II Bike Lanes currently exist along portions of Mission Road, Fallbrook Street, and Ammunition Road; however, there is no connectivity between each other or a larger network. It should be noted that there are no existing bicycle facilities in the Town Center along Main Avenue or any adjacent side streets. While future facilities are planned on select side streets, nothing is planned or proposed on Main Avenue.

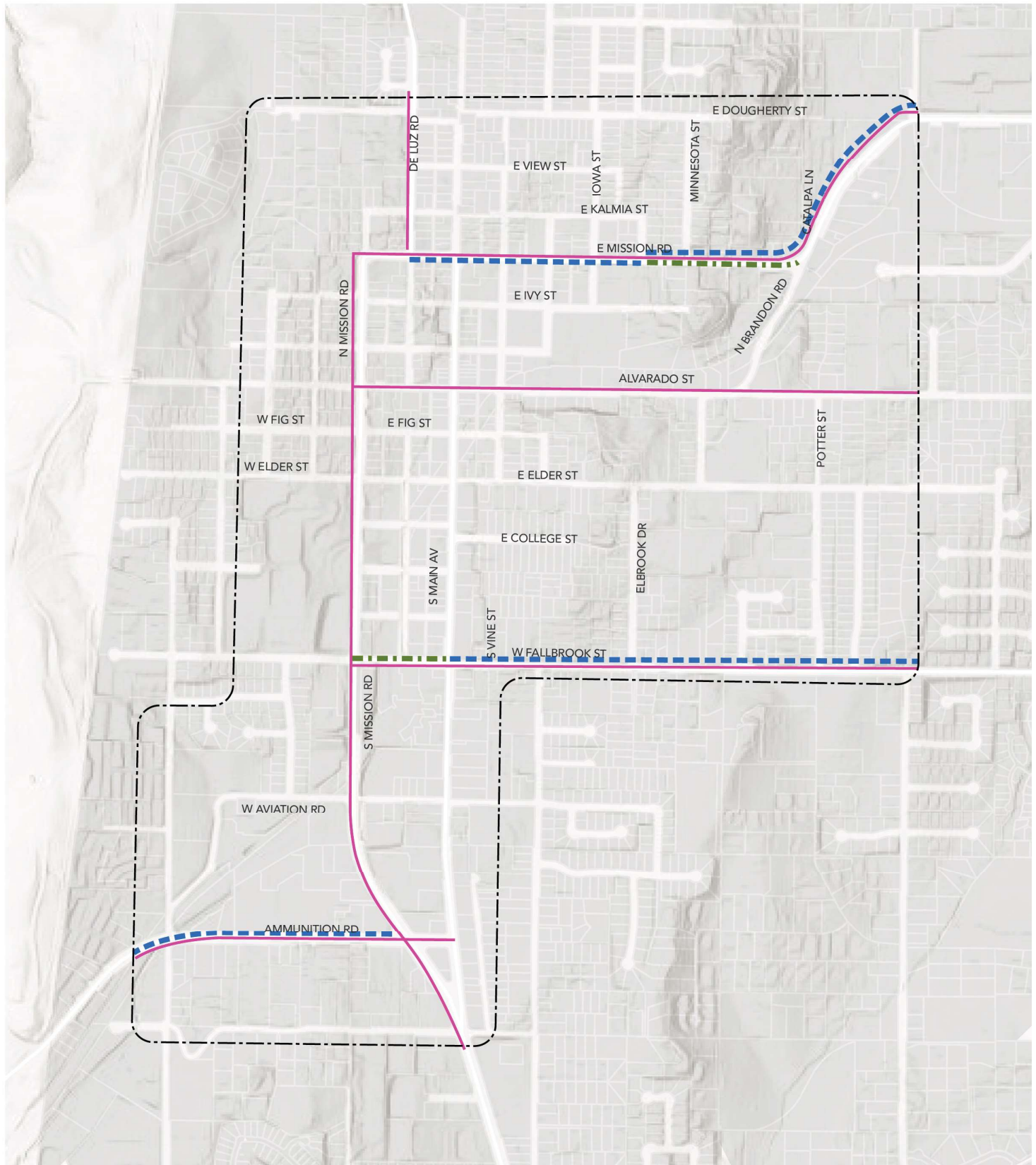


Figure 9: Existing Class II bike lane on East Mission Road east of Brandon Road

Exhibit 7 displays the existing bicycle facilities within the Fallbrook Village Sub-Area as well as the future facilities according to the 2018 Active Transportation Plan.

The County of San Diego's *Active Transportation Plan (ATP)* proposes approximately 75 miles of dedicated bicycle facilities in the greater Fallbrook Community which includes 1.2 miles of Class I Shared-Use Paths, 54 miles of Class II Bike Lanes, and 19.25 miles of Class IV Separated Bike Lanes. **Exhibit 7** shows the planned bicycle lanes according to the SANDAG regional bike map. It should be noted these do not included Type III shared bicycle facilities.

These future bicycle lanes could address the existing bicycle gaps and increase connectivity within the community.. **Chapter 6** of this report discuss planned future bicycle improvements.



— Planned Future Class IV Bike Way

- - - Existing Class II Bike Lane

... Existing Class III "Sharrows"

Source: MIG

Note: All existing bicycle facilities to be improved to Class IV Bike Way per SDC ATP

4.1 BICYCLE ASSESSMENT

4.1.1 Bicycle Assessment Methodology

Existing bicycle facilities were assessed using a Level of Traffic Stress (LTS) analysis consistent with the methodology for assessing bicycle facilities that is outlined in the County's ATP. LTS is a qualitative measure that assesses a bicyclist's level of discomfort or stress based on the quality of the bicycling environment and provided facilities. LTS scores range from LTS 1 (most comfortable, least stressful) to LTS 4 (least comfortable, most stressful).



LTS 1 Typical Users

LTS 1 – Represents the most comfortable and least stressful bicycling environment. LTS 1 is the level that is comfortable for most people, including children.



LTS 2 Typical Users

LTS 2 – Represents a fairly comfortable and low-stress bicycling environment. LTS 2 is the level that is comfortable for the mainstream adult population.



LTS 3 Typical Users

LTS 3 – Represents a fairly uncomfortable and high-stress bicycling environment. LTS 3 is the level that is comfortable for those who are confident in their bicycling abilities but prefer to have dedicated space while riding.



LTS 4 Typical User

LTS 4 – Represents the least comfortable and most stressful bicycling environment. LTS 4 is tolerated only by the most seasoned and confident cyclists but is generally avoided by all other people who want to bike.

The LTS analysis traditionally takes into account existing facilities—such as bike lanes, bike paths, bike routes, and any provided separation from vehicles—that are constructed. In general, roads with dedicated space for people biking are considered to be less stressful.

The LTS analysis can also be used to forecast the level of stress of future or proposed facilities if planned roadway characteristics are known. Several factors of data are needed to assess existing and planned improvements. The data used for this assessment was found using in-person site observation and Google

Earth analysis. The data used included the number of lanes in each direction, presence and type of bicycle facility, presence and type of median, speed, and functional class of the roadway.

The thresholds used for the LTS analysis were adapted from those developed in the paper “Low-Stress Bicycling and Network Connectivity” prepared by the Mineta Transportation Institute.¹ In the paper, the provided thresholds were used to analyze the road network in urban San Jose. The Mobility Assessment thresholds were modified to account for the data available and the community characteristics of Fallbrook.

Table 5 summarizes the LTS criteria for roadways that allow bicyclists to mix with traffic. Bicyclists mix with traffic both when a bicycle facility is not provided and when a Class III bike route is provided. A Class III bicycle facility requires bicyclists to claim the vehicular lane and requires a high level of bicycling confidence. As shown, a roadway with a speed of 20 MPH, street width of two lanes, and a residential functional class was assigned a value of LTS 1. A roadway with speed greater than 35 MPH is categorized as LTS 4.

TABLE 5 - CRITERIA FOR ROADWAYS WITH MIXED TRAFFIC
(ROADWAY WITH NO BICYCLE FACILITY OR A CLASS III FACILITY)

Speed Limit	Width of Street (travel lanes in one direction)		
	1 lane	2–3 lanes	4+ lanes
Up to 25 mph	LTS 1 ^a or 2 ^a	LTS 3	LTS 4
30 mph	LTS 2 ^a or 3 ^a	LTS 4	LTS 4
35+ mph	LTS 4	LTS 4	LTS 4

Adapted for the City of Imperial Beach from Maaza C. Mekuria, Peter G. Furth, and Hilary Nixon, 2012, <http://transweb.sjsu.edu/PDFs/research/1005-low-stress-bicycling-network-connectivity.pdf>.

Note: ^a Use lower value for streets classified as residential with fewer than three lanes; use higher value otherwise.

For Class I (bike path) and Class II (bike lane) facilities, the LTS criteria are different and assume that cycling along a separated bicycle facility is less stressful than riding in mixed traffic. The criteria yielding the highest LTS were applied for each roadway. **Table 6** summarizes the criteria for roadways with a Class I or Class II bike facility.

TABLE 6 - CRITERIA FOR ROADWAYS WITH BICYCLE FACILITIES

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Street Width (through lanes per direction)	1	2 (if directions are separated by a raised/striped median)	More than 2, or 2 without a raised/striped median	(no effect)
Bike Facility Type	Class I	Class II	(no effect)	(no effect)
Speed	30 mph or less	(no effect)	35 mph	40 mph or more

Adapted for the City of Imperial Beach from Maaza C. Mekuria, Peter G. Furth, and Hilary Nixon, 2012, <http://transweb.sjsu.edu/PDFs/research/1005-low-stress-bicycling-network-connectivity.pdf>.

Note: (no effect) = factor does not trigger an increase to this level of traffic stress

¹ Maaza C. Mekuria, Peter G. Furth, and Hilary Nixon, *Low-Stress Bicycling and Network Connectivity* (San Jose, CA: Mineta Transportation Institute, 2012), <http://transweb.sjsu.edu/PDFs/research/1005-low-stress-bicycling-network-connectivity.pdf>.

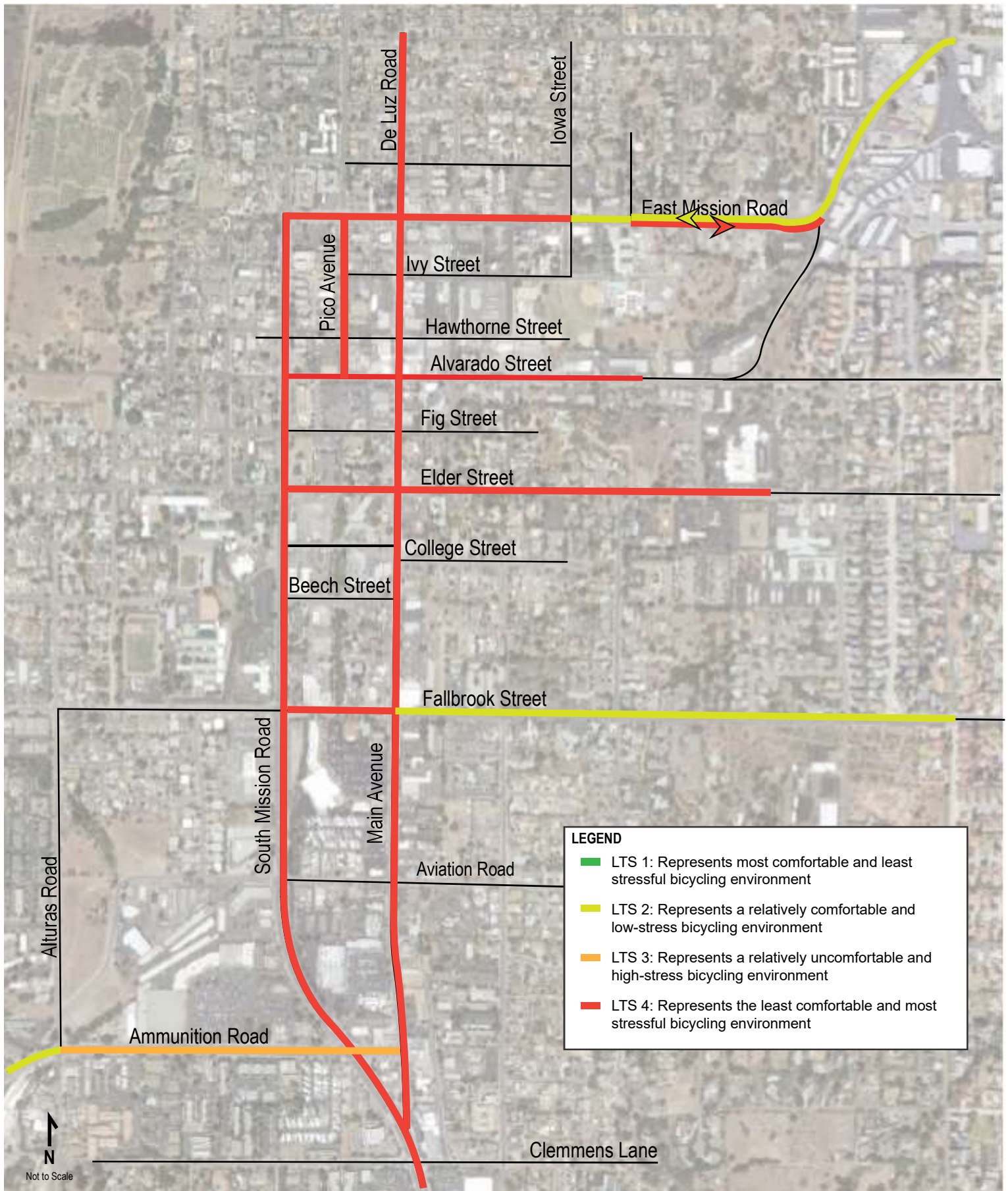
4.1.2 LTS Analysis

Table 7 and **Exhibit 8** shows the results of the LTS analysis conducted for the existing conditions throughout the Fallbrook Village Sub-Area. While the LTS analysis includes bicycle facilities outside of the Town Center, it is important to consider the connectivity of the entire roadway network with the community.

The lack of dedicated existing bicycle facilities results in a high level of bicycle stress (LTS 4), which indicates that the most confident bicyclists (categorized as “Strong and Fearless”) would likely ride on the roadway than those with less capabilities and confidence. The addition of dedicated facilities and the incorporation of traffic calming features would improve the bicycling environment in the Fallbrook Village Sub-Area.

TABLE 7 – EXISTING CONDITIONS BICYCLE LTS ANALYSIS

Street Name	Cross Street 1	Cross Street 2	Direction	Presence of Bicycle Facility	Number of Travel Lanes	Observed Speed	Total LTS Score	Suitable for
Mission Road	Clemmens Lane	Ammunition Road	SB	None	2	35+ mph	4	Strong and Fearless Bicyclists
			NB		2	35+ mph		
	Ammunition Road	W. Mission Road	SB	None	2	35+ mph	4	Strong and Fearless Bicyclists
			NB		2	35+ mph		
	Hill Avenue	Main Avenue	East	None	1	35+ mph	4	Strong and Fearless Bicyclists
			West					
	Main Avenue	Iowa Street	East	None	1	35+ mph	4	Strong and Fearless Bicyclists
			West					
	Iowa Street	Olive Avenue	East	Class II Bike Lane	1	35+ mph	2	Interested but concerned
			West					
	Olive Avenue	Catalpa Lane	East	Class III - Shared	1	35+ mph	4	Strong and Fearless Bicyclists
			West	Class II Bike Lane			2	Interested but concerned
	Catalpa Lane	Santa Margarita Drive	East	Class II Bike Lane	1	35+ mph	2	Interested but concerned
			West					
North Pico Avenue	Alvarado Street	Mission Road	SB	None	1	Up to 25 mph	4	Strong and Fearless Bicyclists
			NB		1	Up to 25 mph		
De Luz Road	Kalmia Street	Dougherty Street	SB	None	1	30 mph	4	Strong and Fearless Bicyclists
			NB					
Main Avenue	Mission Road	Elder Street	SB	None	1	30 mph	4	Strong and Fearless Bicyclists
			NB					
	Elder Street	Ivy Street	SB	None	1	30 mph	4	Strong and Fearless Bicyclists
			NB					
	Ivy Street	Mission Road	SB	None	1	30 mph	4	Strong and Fearless Bicyclists
			NB					
Ammunition Road	La Galiana Cortez Apts	Alturas Street	East	Class II Bike Lane	1	35+ mph	2	Interested but concerned
			West					
	Alturas Street	Main Avenue	East	Class II Bike Lane	2	35+ mph	3	Enthusied + Confident
			West					
Fallbrook Street	Mission Road	Main Avenue	East	Class III Bike Route	1	35+ mph	4	Strong and Fearless Bicyclists
			West					
	Main Avenue	Morro Road	East	Class II Bike Lane	1	35+ mph	2	Interested but concerned
			West					
Elder Street	Mission Road	Morro Road	East	None	1	Up to 25 mph	4	Strong and Fearless Bicyclists
			West					
Alvarado Street	Mission Road	Morro Road	East	None	1	30 mph	4	Strong and Fearless Bicyclists
			West					



5 EXISTING TRANSIT CONDITIONS

5.1 EXISTING TRANSIT FACILITIES

North County Transit District (NCTD) operates the local bus service within the Fallbrook Community. NCTD's BREEZE Route 306 travels along Mission Road and loops back down Main Avenue as shown in **Figure 10** connecting Fallbrook, Bonsall, and Vista. The route travels to and from the Vista Transit Center which provides local connections to seven other BREEZE routes as well as the SPRINTER light rail line.

Service is provided Monday through Friday, weekends, and holidays. According to the NCTD website. The average headway (time interval between arrivals) is approximately 30 minutes from 5:20 AM to 9:50 PM on an average weekday to and from the Vista Transit Center. During the weekend, service is provided from 5:50 AM to 8:50 PM with an average headway of one hour.

Within the Fallbrook Village Sub-Area, there are 10 bus stops along Mission Road and Main Avenue. The existing quality for each bus stop was evaluated based on the presence of the following amenities which are summarized in **Table 8** and **Exhibit 9**:

- Shelters
- Benches
- Trash Receptacles
- Bus Stop Signage
- Maps/Wayfinding
- Lighting
- ADA Compliancy/Access



Figure 10: NCTD Route 306

TABLE 8 - ROUTE 306 TRANSIT AMENITIES SUMMARY

Bus Stop (direction)	Available Amenities						
	Shelter	Bench	Trash Receptacle	Sign	Map	Lighting	ADA Compliant
1 Clemens Ln / Mission Rd (NB)		✓	✓	✓	*	✓	✓
2 Ammunition Rd / Main Ave (NB)				✓			✓
3 Fallbrook St / Main Ave (NB)				✓		✓	✓
4 Elder Rd / Main Ave (NB)				✓		✓	✓
5 Vine St / Ivy St (NB)				✓			✓
6 Hill Ave / Mission Rd (SB)				✓			✓
7 Beech St / Mission Rd (SB)				✓			✓
8 Fallbrook St / Mission Rd (SB)				✓		✓	✓
9 Ammunition Rd / Mission Rd (SB)	✓	✓	✓	✓	*	✓	✓
10 Clemens Ln / Mission Rd (SB)	✓	✓	✓	✓	✓	✓	✓

Note: Bus Stop locations are illustrated in **Figure 10** and illustrated northbound, counterclockwise

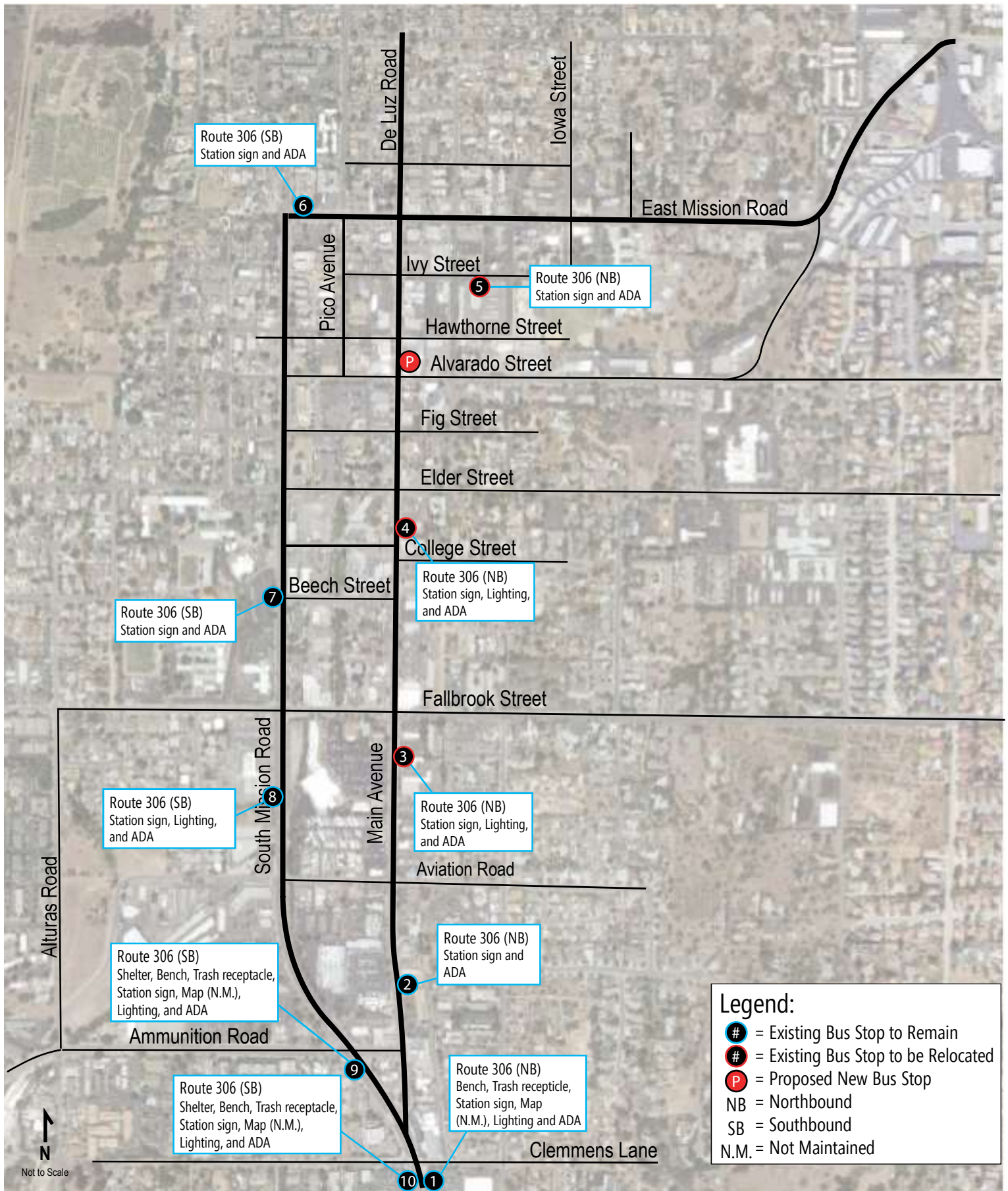
* Facilities exist but has indications of damage/disrepair.

All amenities noted above would ideally be implemented at all transit stops. The County of San Diego's General Plan includes a public transit goal and policies and is summarized as follows:

Develop a public transit system that reduces automobile dependence and serves all segments of the population by maximizing transit service opportunities; providing transit service to key community facilities and services; placing transit stops in locations that facilitate ridership; incorporating amenities for pedestrians and bicyclists at all transit stops; improving existing transit facilities; addressing opportunities for park-and-ride facilities; and coordinating inter-regional travel modes and shuttles to large employment centers.²

Through collaboration with NCTD, there have been four bus stop locations identified for future improvements including three relocated stops and one new stop at the north-east corner of Main Avenue and Alvarado Street. Refer to Chapter 8 for additional discussion on future transit stops. Any improvements associated with the streetscape improvements would improve pedestrian and bicycle access to transit stops.

² San Diego County General Plan, Chapter 4: Mobility Element, Page 4-23, Goals M-8.1 through M-8.8



6 PLANNED FUTURE IMPROVEMENTS

As outlined in the County of San Diego's 2018, Active Transportation Plan (ATP), communities should strive to create a built environment to improve safety by reduce auto collisions with cyclists and pedestrians, increase accessibility and connectivity, and improve public health by encouraging walking and biking while maintaining the character of each community.

The following section outlines planned future sidewalk and bicycle improvements to serve the estimated 6,150 total daily bicycle and walking trips within the Fallbrook Community (ATP, Table 4-6) anticipated by Year 2050 and will help to address the existing gaps in connectivity within the community.

6.1 COUNTY OF SAN DIEGO ACTIVE TRANSPORTATION PLAN (ATP)

"Active transportation" is a term used to describe any non-motorized form of travel, including biking, walking, horseback riding, etc. The County of San Diego's *Active Transportation Plan* (October 2018) or *ATP* is a plan that balances environmental, economic, and community interests and identifies goals, objectives and actions related to:

- Improving safety to reduce auto collisions with cyclists and pedestrians;
- Increasing accessibility and connectivity with an active transportation network; and
- Improving public health by encouraging walking and biking.

The *ATP* includes recommendations to construct approximately 75 miles of dedicated bicycle facilities within the overall Fallbrook Community Planning Area. This includes 1.2 miles of Class I bike lanes, 54 miles of Class II facilities, and 19.25 miles of Class IV facilities. Refer to [Appendix C](#) for excerpts from the *ATP*.

The *ATP* recommends the following bicycle facilities within the Village Sub-Area:

- South/East Mission Road – Class IV Cycle Track
- Alvarado Street – Class IV Cycle Track
- Fallbrook Street – Class IV Cycle Track

If determined to be safe and feasible after further study, these improvements would improve the bicycle connectivity within the Fallbrook Community and help to address the existing deficiencies.

6.2 County of San Diego Capital Improvement Projects

The County's Department of Public Works (DPW) is responsible for (but not limited to) County maintained roadways, traffic engineering, and the engineering and construction management for public works related infrastructure. DPW has published the 5 Year Capital Improvement Plan (CIP) for Fiscal Years 2021/22 to 2025/26 which consists of improvements to roads & bridges, airports, flood control & wastewater facilities, and other public infrastructure facilities operated by the County. The CIP is a comprehensive program for improving infrastructure within the unincorporated areas of San Diego County, including the Fallbrook Community.

There are eight near-term improvements identified in the CIP within the greater Village Sub-Area and an additional seven improvements identified in the greater Fallbrook Community for a total of 15 planned improvement projects.

Future improvements within the greater Village Sub-Area identified in the CIP are listed below. It should be noted that the sidewalk improvements on Aviation Street were completed in Fall 2021. Detailed excerpts are included in [Appendix E](#).

- Fallbrook Street / Old Stage - New Traffic Signal
- S. Mission Road / Clemmens Lane – Pedestrian Enhancements
 - Install ped. countdown signal head, pushbuttons, upgrade curb ramps & crosswalks
- S. Mission Road / Alvarado Street – Pedestrian Enhancements
 - Install ped. countdown signal head, pushbuttons, upgrade curb ramps & crosswalks
- East Alvarado Street - South Vine Street to Brandon St (approximately 500 feet)
 - Construct new sidewalks, ADA enhancements
- Ammunition Road – Alturas Road to S. Mission Road (approximately 230 feet)
 - Construct new sidewalks, ADA enhancements
- West Alvarado Street – Mission Road to Main Avenue (approximately 450 feet)
 - Construct new sidewalks
- West Aviation Street – Mission Road to Main Avenue (approximately 600 feet)
 - Construct new sidewalks
 - **Completed Fall 2021**
- Elder Street – Mission Road to Pico Avenue (approximately 700 feet)
 - Construct new sidewalks

The future improvements identified above as outlined in the CIP will help to improve the pedestrian connectivity and access throughout the Fallbrook Village Sub-Area. However, these do not address the existing sidewalk deficiencies identified along Main Avenue.

7 POTENTIAL STREETSCAPE TREATMENTS

The following pages provide descriptions and examples of various transportation related concept elements that could be incorporated into the streetscape improvements to improve access and mobility for users of modes and abilities. These elements include:

- Curb Extensions (Bulb-Outs)
- Marked Crosswalks
- Rectangular Rapid Flashing Beacons (RRFB)
- Controlled Pedestrian Crosswalks
- Raised Medians
- Sidewalks
- Bike Lanes
- Intersection Control Options

These treatments are a sample of potential improvements options as outlined in Appendix B: Active Transportation Plan Toolbox of the County's ATP. While these treatments are provided as potential options for streetscape improvements, they may not be feasible or desirable in the Town Center.

7.1 CURB EXTENSIONS (BULB-OUTS)

A curb extension, also known as a bulb-out, is a traffic calming measure that widens the sidewalk for a short distance and extends the curb space at the corners of an intersection in order to reduce the crossing distance for pedestrians. Curb extensions may be constructed at intersection corners or mid-block crosswalks. See **Figure 11**.

Curb extensions increase visibility for pedestrians and drivers by bringing the pedestrian closer to the edge of the travel-way at a marked crossing. This reduces the pedestrian crossing distance which reduces the time pedestrians are in the street. Curb extensions also provide visual friction which can result in more cautious driving and can result in slower vehicle speeds.

Road classification, lane width, road width, sidewalks, curb radii, truck turning radii and on-street parking should all be considered when designing curb extensions. Appropriate signage for vehicles, bicyclists, and pedestrians should be provided at all potential conflict points. Placement of street furniture and landscaping on curb extensions should ensure that sight lines are not obstructed and properly maintained.

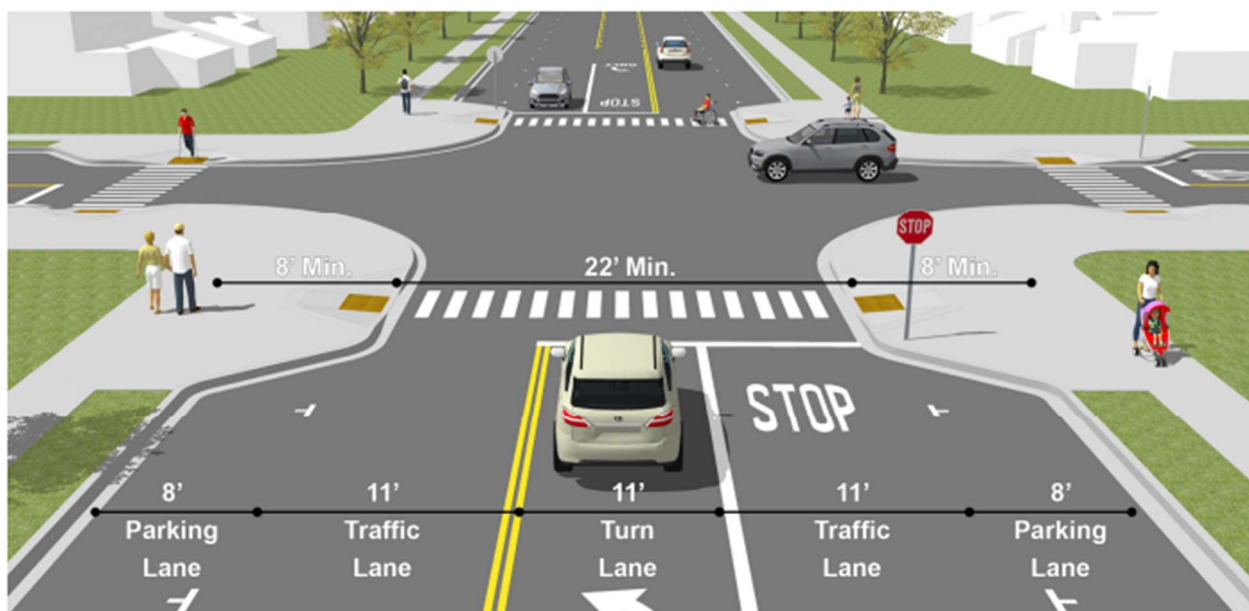


Figure 11: Typical Cross Section with Curb Extensions (Source: SDC ATP: Appendix B – ATP Toolbox)

7.2 MARKED CROSSWALKS

Marked crosswalks indicate a preferred location for pedestrians to cross a roadway, and alert motorists and cyclists to anticipate pedestrians. Marked crosswalks are complemented by curb ramps and ADA access signage with improved visibility of the crossing. At signalized intersections, pedestrian countdown signal heads help inform pedestrians of how much time they have left to cross. Marked crosswalks at locations other than signalized intersections should be coupled with either a pedestrian signal/high intensity activated crosswalk (HAWK) or a Rectangular Rapid Flashing Beacon (RRFB).



Figure 12: High Visibility Continental Crosswalk and Basic Crosswalk with Decorative Paving at Main Avenue and Hawthorn Street

The *California Manual on Traffic Control Devices (CA MUTCD)* identifies three types of crosswalks as appropriate for marked pedestrian crossings: ladder, diagonal, and continental (see [Figure 4](#)). Diagonal and continental are considered high visibility crosswalk markings per the *CA MUTCD*. To improve the visibility of the existing marked crossings and for all new marked crossing installations, continental crosswalks are preferred over standard parallel crosswalks.

Some crossing locations include pedestrian refuge islands to shorten a pedestrian's crossing distance and provide pedestrians a refuge. Typical crosswalks are striped with white paint.

In school zones yellow paint should be used to mark the crossings. Pedestrian crosswalks are typically 10 feet in width with white or yellow markings. However, design and installation of marked crosswalks should comply with the County of San Diego Roadway Standards and California Manual on Uniform Traffic Control Devices standards. Crosswalks should remain visible and may require ongoing maintenance to minimize fading.

7.3 RECTANGULAR RAPID FLASHING BEACONS

Rectangular Rapid Flashing Beacons (RRFB's) are pedestrian activated enhancements used to improved visibility and increase driver awareness at uncontrolled marked crossings. The device includes two rectangular shaped yellow indications with LED light's that flash when activated by either a pedestrian, or passively through detection. RRFB's may be powered by a standalone solar panel unit, or hard-wired to a nearby power source.

RRFB's improve pedestrian safety and increase motorist yielding at crosswalks at a lower cost compared to pedestrian signals.



Figure 13: Activated RRFB on two-lane roadway (City of Lincoln, NE)

7.4 CONTROLLED PEDESTRIAN CROSSINGS

Controlled Pedestrian Crossings, such as a High-Intensity Activated Crosswalk (HAWK) Signal, or a Pedestrian Signal, are used to warn and control vehicle traffic at a marked crosswalk. Controlled Pedestrian Crossings are typically located mid-block or at an intersection where a traffic signal is not warranted for vehicular traffic. Unlike RRFB's, controlled crossings provide a clear indication for the assignment of right of way at the marked crosswalk and vehicles are required to stop at these controlled crossings when activated by a pedestrian.

Both the driver and the pedestrian or bike are provided a clear indication of when to stop or wait and when to proceed. The signal or HAWK is activated by the pedestrian using a push-button and pedestrians must wait for the WALK sign to proceed. During that time, autos are provided a RED light and are required to stop. If the signal is not activated by a pedestrian, motorists are permitted to drive through the crosswalk but are cautioned to slow down and look for the presence of nearby pedestrians.



Figure 14: Example of pedestrian signal



Figure 15: Example of HAWK signal at controlled crosswalk.

7.5 RAISED MEDIANS

Raised medians are curbed sections that typically occupy the center of the roadway. Raised medians within a roadway such as Main Avenue can be either landscaped or paved.

Continuous raised medians may restrict vehicular access at intersections and driveways. They may be used to concentrate left-turn movements at specific locations and tend to result in an increase of the frequency of U-turns at a signalized intersection or at gaps in the median. However, raised medians can improve safety by providing a physical barrier between opposing directions of traffic thus reducing vehicle conflicts.

Raised medians tend to serve as a place of refuge for pedestrians and bicyclists who cross a street midblock or at intersections. In addition, raised medians allow pedestrians and bicyclists to cross one direction of traffic at a time. In addition, medians with natural landscaping also serve as natural bio-swaes for managing stormwater. While medians are a viable streetscape treatment, they may not be feasible or desirable in the Town Center area.



Figure 16: Example of a raised median

